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SPILL RESPONSE EXERCISE ASSESSMENT
MACKENZIE RIVER, FORT SIMPSON
INTERPROVINCIAL PIPE LINE (NW) LTD.
ESSO RESOURCES CANADA LTD.
JUNE 1987

REPORT EP(EP)WNR 87/88-8

Environmental Protection

Protection de l'environnement

Canada

REVIEW AND ASSESSMENT OF A SPILL RESPONSE EXERCISE UNDERTAKEN ON THE MACKENZIE RIVER AT FORT SIMPSON, NORTHWEST TERRITORIES ON JUNE 24, 1987, BY INTERPROVINCIAL PIPE LINE (NW) LTD. AND ESSO RESOURCES CANADA LTD.

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ABSTRACT

On June 24, 1987, Interprovincial Pipe Line (NW) Ltd. (IPL) and Esso Resources Canada Ltd. (Esso) held a joint spill recovery training exercise on the northeast shore of the Mackenzie River at Fort Simpson, N.W.T. Spill team members included IPL and Esso staff and contracted labourers from Nogah Enterprises Ltd. in Fort Simpson.

Several problem areas were identified which should be corrected by both government and IPL if IPL's effectiveness in responding to an oil spill is to be fairly evaluated. These include:

- the need for the NWT Water Board to clarify the reasons for conducting spill exercises and to issue criteria against which company success can be evaluated;
- the need for time trials to enable the evaluation of IPL's efficiency in spill response;
- the need for the practice deployment of portable storage facilities for holding recovered material;
- the need for a common training standard for IPL/Esso staff who supervise oil spill crews; and
- the need for a standing list of experienced and trained individuals available on short notice for emergency duties with IPL and Esso.

TABLE OF CONTENTS

Page

Abstract.....1

Table of Contents.....2

List of Figures.....3

I INTRODUCTION.....4

II DETAILS OF THE SPILL RESPONSE TRAINING EXERCISE...5

1.0 Scenario, Site Description, Response Equipment and Communications 5

1.1 Scenario 5
1.2 Site Description & Response Equipment...5
1.3 Communications 5

2.0 Chronology of Spill Response Events.....6

3.0 Problems Experienced During the Spill Response Exercise 13

III RECOMMENDATIONS.....13

LIST OF FIGURES

Page

FIGURE 1: Shore-based oil spill equipment was deployed by IPL on the Mackenzie River immediately downstream from the confluence of Harrison Creek. The view is to the southeast..... 7

FIGURE 2: Sections of oil boom were assembled onshore to form the deflection boom..... 7

FIGURE 3: The deflection boom was towed to its anchorage..... 9

FIGURE 4: Shore-based anchor ropes were hauled inshore by field crews to properly align the deflection boom..... 9

FIGURE 5: The oil skimmer and skimmer corral boom were assembled on site.....11

FIGURE 6: The oil skimmer corral boom was towed into position.....11

FIGURE 7: Styrofoam chips were pumped from the skimmer corral boom to a shore-based Port-A-Tank.....12

I INTRODUCTION

On June 24, 1987, a spill recovery and communication exercise was held on the Mackenzie River at Fort Simpson by Interprovincial Pipe Line (NW) Ltd. (IPL) with the assistance of Esso Resources Canada Ltd. (Esso). The spill exercise was conducted by IPL and Esso for three reasons: as a regulatory requirement of NWT Water License N3L6-1126 (Mackenzie River Crossing); to train supervisory field staff; and to familiarize local contract personnel in the deployment of the spill recovery equipment.

In this exercise, 10 of the 40 participants were labourers contracted by IPL from Nogah Enterprises Ltd. in Fort Simpson. Four Nogah staff supplied river boats and were employed to provide ferry service to the Harrison Creek/Mackenzie River site for people interested in viewing the exercise. The remaining 10 Nogah personnel were employed directly in the deployment of spill recovery equipment. Other response team members included 10 IPL workers from Fort Simpson and five Norman Wells staff from both Esso and IPL. Also in attendance were a number of IPL management personnel from Edmonton, four observers from federal government departments and approximately ten observers from the community of Fort Simpson.

According to Mr. D. Wishart (Environmental Coordinator for IPL), the principle objective of the training exercise was to provide IPL work crew leaders with operational experience in the deployment of oil spill response equipment and in the management of field crews who handle the equipment. The previous experience of these staff in responding to oil spills had been quite variable. Supervisory personnel with some prior experience were assigned different roles in the response exercise to provide them with an opportunity to broaden their abilities.

Because IPL chose to place the emphasis of this exercise on the training of it's staff, it was not possible to fully evaluate the actual ability of the company to effectively respond to an oil spill on the Mackenzie River.

II DETAILS OF THE SPILL RESPONSE TRAINING EXERCISE

1.0 Scenario, Site Description, Response Equipment and Communications

The scenario for the exercise was the rupture and complete loss of product from the Mackenzie River pipeline crossing. One shore-based site was used in this training exercise. Equipment included spill containment booms, a sorbant boom, a skimmer, support boats and a Bell 206L helicopter mounted on skids and equipped with a cargo hook. Communication between personnel was achieved with VHF transceiver radios and bullhorns.

1.1 Scenario

The Water License granted to IPL at Fort Simpson permits the construction and operation of a pipeline crossing beneath the bed of the Mackenzie River. The spill report filed for this exercise stated that there had been a sudden loss of 40 m^3 of oil from the pipeline section buried beneath the riverbed and that the emergency shut-off valves located on each riverbank had functioned correctly to isolate this section from further leakage. In order to simulate the recovery of spilled oil at the site, styrofoam chips were scattered over the final recovery area and were collected and pumped to an interim holding facility.

1.2 Site Description and Response Equipment

IPL chose to deploy its equipment on the northeast bank of the Mackenzie River at Harrison Creek. At this site, two booms were deployed in a configuration designed to use the current of the Mackenzie River (estimated at three to five knots) to both herd and collect a surface slick (Figure 1). When finally assembled, the first of these booms was 250' long and was used to deflect the slick inshore. The second boom was 100' long and was deployed to corral the deflected product. A hand-operated skimmer was centrally placed within this second boom and two pumps were used to remove the product to a 1500 gallon (6819 litre) capacity Port-A-Tank. Accumulated water was decanted using a drainage sleeve. No provision was made to drain contained waste from the Port-A-Tank into a larger capacity storage tank.

1.3 Communications

A portable base station radio was established and used by the on-scene commander to communicate with IPL equipment dispatch headquarters. Communications between supervisory team members was achieved using hand-held radios. Communications between supervisory team members and labourers was supplemented through the use of hand-held bullhorns.

2.0 CHRONOLOGY OF SPILL RESPONSE EVENTS

The spill response exercise was used by IPL as an operational means to train supervisory staff. No attempt was made by the company to test the speed with which its staff could respond to an actual spill event. The following account should therefore be viewed simply as a listing of the order in which events occurred.

Time (June 24, 1987)	Event
1330 hours	- helicopter arrived on bank of Harrison Creek
1340 hours	- on-scene commander has radio communications post established and can talk to Fort Simpson equipment dispatch
	- some equipment is already present on the beach (ex. pumps, boom, etc.)
	- second helicopter sling load of boom arrived
1345 hours	- crews started to deploy boom along river edge (see Figure 2)
1350 hours	- third helicopter sling load of boom arrived
1351 hours	- first group of boom anchors was deployed in the Mackenzie River just downstream from the mouth of Harrison Creek
1352 hours	- most of the on-shore boom anchor-points were installed. Three sections of boom were assembled and were laid out at the river's edge
1358 hours	- fourth helicopter sling load of boom arrived. Workboat crew tensioned and set the boom anchors

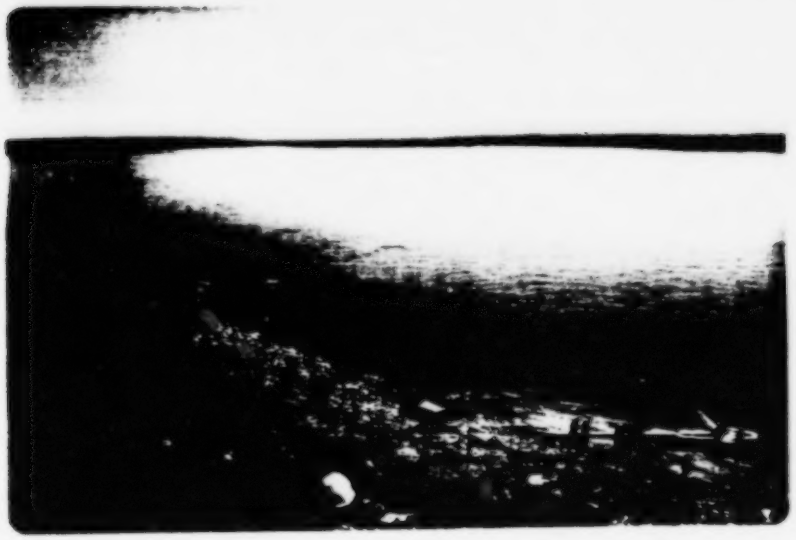

FIGURE 1: Shore-based oil spill equipment was deployed by IPL on the Mackenzie River immediately downstream from the confluence of Harrison Creek. The view is to the southeast.

FIGURE 2: Sections of oil boom were assembled onshore to form the deflection boom.

Time (June 24, 1987)	Event
1402 hours	- fifth helicopter sling load of boom arrived
	- 250-foot long deflection boom was fully assembled using 50 foot sections
1408 hours	- sixth helicopter sling load of boom arrived consisting of two spools of polyethylene rope. Anchoring ropes were attached to both ends of the boom
1415 hours	- pumps were primed with water
1417 hours	- seventh helicopter sling load, containing the skimmer unit and a Port-A-Tank, arrived
1420 hours	- 250-foot long deflection boom was picked up and placed in the river by ten workers
1421 hours	- deflection boom, tethered to 100 feet of rope, was towed by a workboat to its anchorage (see Figure 3)
1423 hours	- deflection boom tow rope was tied off to anchor float (see Figure 4)
	- eighth helicopter load consisting of the skimmer screen and an anchor float, arrived;
1429 hours	- downstream end of deflection boom was made fast to the shore
	- first onshore anchor line was attached to the upstream head of the deflection boom by a workboat crew
	- 5-man shorecrew hauled in the boom side-anchor rope and drew the deflection boom towards shore (see Figure 4)

FIGURE 3: The deflection boom was towed to its anchorage.

FIGURE 4: Shore-based anchor ropes were hauled inshore by field crews to properly align the deflection boom.

Time (June 24, 1987	Event
1438 hours	- ninth helicopter sling load of equipment arrived - entire load consisted of a boom
1445 hours	- last of four on-shore anchor lines was attached by the workboat crew
	- all anchor lines were adjusted for tension so that the deflection boom was correctly aligned
1455 hours	- deployment of deflection boom was completed
1455 hours	- first section of the skimmer corral boom was laid out on the beach (see Figure 5)
1458 hours	- assembly of skimmer commenced
1502 hours	- anchor string for skimmer boom was deployed
1510 hours	- pump suction lines were assembled and laid out on the beach
1515 hours	- Port-A-Tank was assembled
	- workboat took skimmer corral boom in tow towards the anchor.
1516 hours	- tenth helicopter load arrived with additional crew
1522 hours	- workboat aborted boom deployment and started lifting the anchor so that it could be moved further upstream. This procedure was undertaken to re-align the skimmer corral boom
1526 hours	- anchor was re-deployed 150 feet further upstream
	- eleventh helicopter load of equipment, consisting of sorbant boom for skimmer, arrived
1530 hours	- offshore anchor line was tightened and the skimmer corral boom was towed into place (see Figure 6)

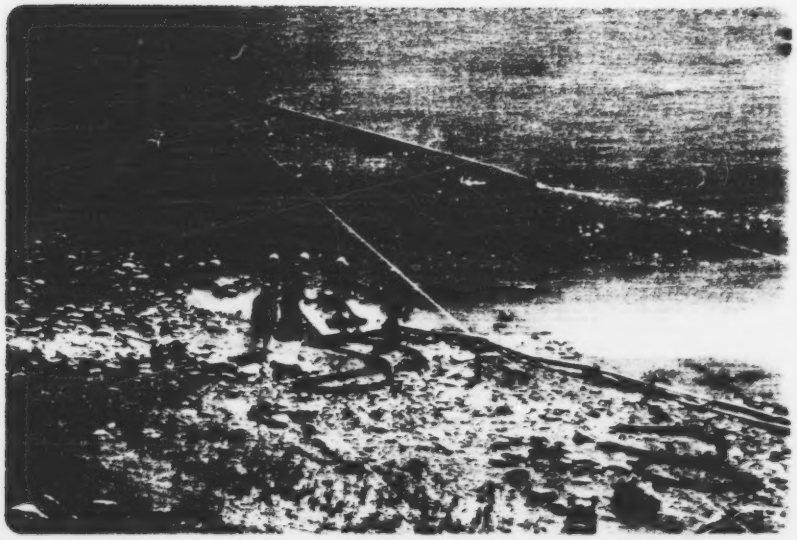

FIGURE 5: The oil skimmer and skimmer corral boom were assembled on site.

FIGURE 6: The oil skimmer corral boom was towed into position.

FIGURE 7: Styrofoam chips were pumped from the skimmer corral boom to a shore-based Port-A-Tank.

Time (June 24, 1987)	Event
1531 hours	- skimmer screen was re-installed
1542 hours	- skimmer corral boom was fully deployed
1550 hours	- two pumps were started and water was pumped into the Port-A-Tank
	- sorbant boom was deployed downstream of the skimmer
1550 hours	- styrofoam chips were spilled within the enclosure formed by the deflection boom to simulate an oil slick
1600 hours	- styrofoam chips were pumped from the skimmer to the Port-A-Tank (see Figure 7)
	- practice deployment of gear was completed after an elapsed time of 2 hours and thirty minutes

3.0 PROBLEMS EXPERIENCED DURING THE SPILL RESPONSE EXERCISE

Problems experienced by IPL staff during the training exercise were of a minor operational nature and were quickly rectified. Most seemed to be related to the use of inexperienced supervisory staff in unfamiliar command positions. The training exercise format allowed these staff to identify their own shortfalls and rectify them.

III RECOMMENDATIONS

1. The purpose of the spill response exercise conducted in response to water license requirements should be clarified by the Water Board. If the purpose of an exercise is to allow government to evaluate the abilities of both Esso and IPL to respond to a spill, future exercises requested by the Water Board should specify the elimination of all training aspects. The exercise would then test the ability of experienced individuals to respond to a simulated spill and would allow an evaluation of the success and true capability of both companies.

2. Criteria for the evaluation of spill response exercises should be drafted by the Water Board and used in conjunc-

tion with requests for future spill response exercises. Evaluations should be assessed by both government and industry to ensure that appropriate solutions to any problems encountered are immediately implemented.

3. Esso and IPL should conduct timed spill response exercises, supported solely by means of boats and barges, at a point downstream, and realistically distant, from Fort Simpson. Because the transportation of gear can become a problem due to limited helicopter availability and/or capability, IPL should consider caching oil spill recovery equipment downstream to allow sufficient time for crews to arrive by boat and deploy the gear. To better estimate true response times, consideration should also be given to the simulation of a real spill event on the River. Response staff should be no more prepared than would be the case on a regular work day. Such a simulation would be of great value to IPL and Esso in planning future spill response exercises and would serve to illustrate, based on a realistic response time, where on the Mackenzie River they could expect to contain and recover spilled material. Consideration should also be given to conducting such exercises at times when less than optimal weather conditions prevail. After crews are thoroughly trained, weather will become the limiting factor in the success of any spill response, followed closely by the availability of appropriate spill recovery sites.

4. No provision was made for the interim storage of spilled material during the response exercise. Had a real oil spill occurred, storage would have been limited to a small Port-A-Tank. Had the capacity of the tank been exceeded, alternate holding facilities would have been required. No empty barges were available to IPL for product storage and it is unlikely that the boulder/rock strewn shoreline would have been suited to the deployment of rubber bladders without some previous ground preparation. Future response exercises should include the deployment of larger capacity storage facilities.

5. There is a need for IPL and Esso to conduct additional operational training of their staff. Unfamiliarity with IPL operational procedures during an oil spill recovery could severely hamper the ability of IPL to effectively recover spilled material. This can only be countered with a continuing commitment from IPL to ensure that its staff receive adequate training.

6. To ensure that properly trained operators are available for key positions in spill response teams, Esso and IPL should establish a formal minimum and common training standard for each supervisory position. Lists of qualified and experienced response crew supervisors should be maintained by each company and used in future spill response exercises. Spill response exercises could then be undertaken by companies as a test of the response system to identify any apparent weaknesses in response procedures. The names of suitably experienced labourers should also be retained to expedite the future emergency hiring of spill-response crews.